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3,741,776

PROCESS FOR PREPARING FOODS AND DRINKS

Masakazu Mitsuhashi, Okayama, Mamoru Hirao, Akaiwa-gun, and Kaname Sugimoto, Okayama, Japan, assignors to Hayashibara Company, Okayama, Japan
No Drawing. Filed Jan. 8, 1969, Ser. No. 789,935

Claims priority, application Japan, Jan. 23, 1968,

43/3,863

Int. Cl. A23I 1/26

U.S. Cl. 99—141 R

4 Claims

ABSTRACT OF THE DISCLOSURE

Maltitol is used as the major or sole sweetener of low or non-calorie foods. It serves the functions of providing solids volume, increased viscosity, body, luster, moisture retention and stability to the food without the necessity of sugary or starchy fillers.

This invention relates to a process for preparing foods and drinks of intensified sweetness with no increases in the caloric values.

For added sweetness of foods and drinks, it has been customary to use sugars and sugar alcohols, such as cane sugar, grape sugar, fruit sugar, starch syrup, honey and sorbitol, and artificial sweetening agents such as saccharin and cyclohexyl-sodium sulfamate. These sugars and sugar alcohols are invariably crystallizable and easily form crystals in the food products under the influence of temperature or at high concentrations. The artificial sweetening materials have rather poor solubility and provide too high degrees of sweetness to attain the purpose of increasing the solid volume of foods and drinks as by the natural sweetenings. These properties of the common sweetening materials offer inconveniences in use and limit their applications. A further disadvantage is that, not to mention the sugars, the sugar alcohols are absorbed and digested by the human body and, for that reason, cannot be used in the preparation of foods and drinks of low- or non-caloric value, or dietetic or fat-reducing diets required by diabetics and stout persons.

The present invention is directed to the elimination of the foregoing disadvantages, and has for an object to provide foods and drinks having necessary sweetness by adding maltitol to food materials thereby providing a degree of sweetness that is higher than that of grape sugar but slightly less than that of cane sugar, and which may be mixed with other artificial sweetenings such as saccharin and hence can provide freely adjustable sweetness.

Another object of the invention is to provide foods and drinks such as sponge cakes, sweet jelly of beans and concentrated juices having high degrees of sweetness which are protected against crystallization of, or whitening by, the sweetening source by adding maltitol as a sweetening source which has no possibility of crystallization even if used at high concentrations.

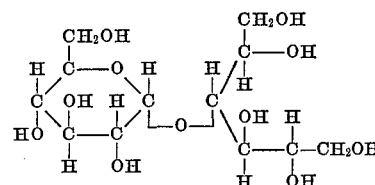
Still another object of the invention is to provide foods and drinks of low or no energy value per unit of weight suitable as dietetic or fat-reducing diets for diabetics and corpulent persons by adding maltitol in the preparation of the food products as a sweetening source which is never digested or absorbed by the human body.

Yet another object of the invention is to provide foods and drinks which stimulate the appetite by adding to the food materials maltitol as a sweetening source which enables the food products to retain or absorb moisture to an adequate level and have increased viscosity to possess the same substance, body and luster as those of sugary foods, and which permits the flavorings and colorants used to be maintained in stabilized state.

A further object of the present invention is to provide foods and drinks containing maltitol as a sweetening source which is extremely stabilized against heat and is capable of imparting sweetness to food products prepared by the application of heat, such as baked cakes, without any possibility of decomposition and coloration of the sweetening source by heat.

Thus, the present invention concerns a process for preparing foods and drinks characterized by the use of maltitol as a sweetening agent therefor which is noncrystallizable, highly soluble, capable of retaining moisture, can confer stability on flavorings and colorants, and has no food value per se.

Maltitol which is used in the practice of the invention is obtained by hydrogenation of pure maltose, in the form of a non-reducing substance as represented by the following formula:



The process for producing maltitol is exemplified as follows. Pure maltose is dissolved in water to prepare a 50% aqueous solution. To the resulting solution is added 8% Raney nickel as a reduction catalyst. The mixture is gradually increased in temperature up to 90°–125° C. with constant stirring. By introducing hydrogen at a pressure of 20–100 kg./cm.² the mixture is caused to absorb the hydrogen. After cooling, the reaction mixture is freed of the Raney nickel and is purified in the usual manner by the use of active carbon and ion exchange resin. The product upon concentration yields maltitol in a colorless, transparent and viscous state.

Investigations on the adaptability of this maltitol for use as an additive to foods and drinks have led to the following findings:

(1) Sweetness

A panel test on sweet taste showed that the sweetness of this substance is round and moderate. It goes off quickly and leaves no thick after taste.

It is sweeter than grape sugar but is less sweet than cane sugar, with sweetness apparently about 75 percent that of the latter.

The panel test, participated in by 30 examiners, gave results as below:

(A) Significant difference

The significant difference was determined by a paired preference test on the following basis:

(1) Equation

$$x^2 = \frac{[(\alpha_1 - \alpha_2) - 0.5]}{N}$$

where

x^2 : Individual panel result

α_1 : Number of right answers

α_2 : Number of wrong answers

N : $\alpha_1 + \alpha_2$

(2) Table of x^2 's (No. of deg. of freedom=1)

Level of significance (percent):	x^2
20	1.642
10	2.706
5	3.841
1	6.635
0.1	10.827